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CLOUD: A New Generation of Neutrino Science at Chooz

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The new ***CLOUD*** experiment, supported by the eponymous international collaboration (16 academic institutions and EDF), will be presented for the first time. *CLOUD* relies on the first ever ~10-ton ***LiquidO*** detector, which will be deployed at the new Chooz's "*ultra-near detector*"site, located at ~30 m from one of the nuclear reactors with minimal overburden. With ≥10,000 antineutrino interactions per day and an expected signal-to-background ≥100, *CLOUD* is designed for unprecedented fundamental physics. The ***CLOUD-I*** addresses the fundamental physics programme associated with the primary goal of the fully-funded (EIC & UKRI) ***AntiMatter-OTech*** innovation-based project that aims to develop non-intrusive industrial reactor monitoring. Also under active exploration, the subsequent ***CLOUD-II*** and ***CLOUD-III*** are independent neutrino scientific programmes exploring novel solar and geo-neutrino detection methodologies otherwise impossible today. The proposed presentation would thus describe the next generation of Chooz-based experiments within the scientific prospect of the large ***SuperChooz*** experiment —also under exploration.

Primary author: COLLABORATION, CLOUD

Co-author: Dr CABRERA, Anatael (IJCLab / CNRS-Université Paris-Saclay)

Presenter: Dr CABRERA, Anatael (IJCLab / CNRS-Université Paris-Saclay)

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